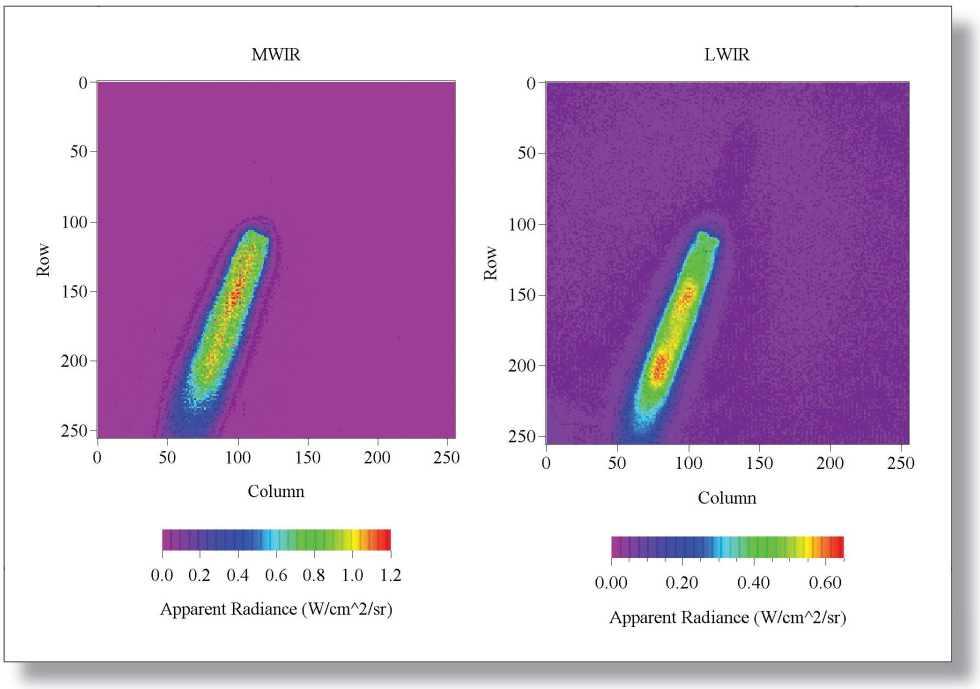
Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

IMPROVED MULTIWAVEBAND INFRARED ARRAYS



The Space Vehicles Directorate's Improved Multiwaveband Infrared Array (IMIRA) program's long wavelength infrared (LWIR) dual band focal plane arrays (FPA) have wavelength cutoffs approaching the difficult 12 micron region. This region is where the mercury cadmium telluride energy gap is relatively narrow, making high performance harder to achieve.

These LWIR FPAs also allow for the demonstration of a novel hyperspectral concept for which a target interferogram, rather than a spectrum, is created and dispersed across one axis of the array. Such a novel hyperspectral sensor benefits greatly from the high percentage (99%+) of operable pixels in the 256 x 256 pixel arrays, since inoperable pixels lead to deviations in the sampling of the interferogram and lowered fidelity of the recovered spectrum.

Air Force Research Laboratory
Wright-Patterson AFB OH

Accomplishment

The directorate's IMIRA program demonstrated superb LWIR FPA performance as part of a progressive effort to develop two- and three-waveband capabilities. The range of application of this technology includes space hyperspectral concepts as well as the more traditional imaging sensor, which benefits from the improved target to background discrimination of dual band phenomenology. In either case, savings in volume, mass, and cryogenic cooling is obtainable, relative to the more traditional approaches involving two single-waveband FPAs and beam splitting optics.

Background

The directorate awarded the IMIRA program to DRS Infrared Technologies in Dallas, Texas, in support of the Category 2B Advanced Technology Demonstration of the same name and also as a vehicle for executing customer and research initiative efforts for dualband and longer LWIR cutoff wavelengths, respectively. Directorate researchers evaluated the FPAs delivered under IMIRA in the directorate's characterization facility and verified the manufacturer's performance claims.

Space Vehicles
Emerging Technologies

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (03-VS-01)